



---

**CONSTRUCTION SPECIFICATION FOR MICRO-SURFACING**

---

**TABLE OF CONTENTS**

<b>336.01</b>	<b>SCOPE</b>
<b>336.02</b>	<b>REFERENCES</b>
<b>336.03</b>	<b>DEFINITIONS</b>
<b>336.04</b>	<b>DESIGN AND SUBMISSION REQUIREMENTS</b>
<b>336.05</b>	<b>MATERIALS</b>
<b>336.06</b>	<b>EQUIPMENT</b>
<b>336.07</b>	<b>CONSTRUCTION</b>
<b>336.08</b>	<b>QUALITY ASSURANCE</b>
<b>336.09</b>	<b>MEASUREMENT FOR PAYMENT</b>
<b>336.10</b>	<b>BASIS OF PAYMENT</b>

**APPENDICES**

<b>336-A</b>	<b>Commentary</b>
--------------	-------------------

<b>336.01</b>	<b>SCOPE</b>
---------------	--------------

<b>336.01.01</b>	<b>General</b>
------------------	----------------

This specification covers the requirements for micro-surfacing and includes all surface preparation, material application, tack coating, handwork, joints, protection while curing, clean up, and trial area.

<b>336.01.02</b>	<b>Specification Significance and Use</b>
------------------	---

This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.

Use of this specification or any other specification shall be as specified in the Contract Documents.

### **336.01.03 Appendices Significance and Use**

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

### **336.02 REFERENCES**

When the Contract Documents indicate that municipal-oriented specifications are to be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications, or publications:

#### **Ontario Provincial Standard Specifications, Construction**

OPSS 710 Pavement Marking

#### **Ontario Provincial Standard Specifications, Material**

OPSS 1001 Aggregates - General  
OPSS 1003 Aggregates - Hot Mixed Asphalt  
OPSS 1103 Emulsified Asphalt  
OPSS 1301 Cementing Materials

#### **Ontario Ministry of Transportation Publications**

MTO Laboratory Testing Manual:

LS-601 Materials Finer than 75 µm Sieve in Mineral Aggregates by Washing  
LS-602 Sieve Analysis of Aggregates  
LS-609 Petrographic Analysis of Coarse Aggregate  
LS-625 Guidelines for Sampling of Granular Materials

Ontario Traffic Manual (OTM):  
Book 7 - Temporary Conditions

SP-024 Manual for Condition Rating of Flexible Pavements – Distress manifestations

## ASTM International

D5/D5M-20 Penetration of Bituminous Materials  
D6997-12(2024) Standard Test Method for Distillation of Emulsified Asphalt

## International Slurry Surfacing Association (ISSA)

TB-100 Wet Track Abrasion of Slurry Surfaces  
TB-109-22 Measurement of Excess Asphalt in Bituminous Mixtures by Use of a Loaded Wheel Tester and Sand Adhesion  
TB-113-24 Trial Mix Procedure for Slurry Seal Design  
TB-139-25 Classify Emulsified Asphalt/Aggregate Mixture Systems by Modified Cohesion Tester  
Measurement of Set and Cure Characteristics  
TB-144-2 4Classification of Aggregate Filler - Bitumen Compatibility by Schulze-Breuer and Ruck Procedures  
TB-147-22 Measurement of Stability and Resistance to Compaction, Vertical and Lateral Displacement of Multi-layered Fine Aggregate Cold Mixes - Method A

### 336.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

**Appurtenances** mean maintenance holes, catch basins, valve chambers, water valve covers, and similar Utility access covers located within the paved portion of the roadway.

**Micro-Surfacing** means a pavement surfacing composed of polymer-modified asphalt emulsion, high quality aggregate, mineral filler, and water.

**Rut Filling** means a layer of micro-surfacing placed on the existing pavement using a rut box on the longitudinal wheel path rut.

**Scratch Coat** means a layer of micro-surfacing placed on the existing pavement prior to placing a surface coat.

**Siliceous Aggregates** means rock particles containing or composed of silica ( $\text{SiO}_2$ ) or minerals with silica in the crystal structure as silicate ( $\text{SiO}_4$ ).

**Surface Coat** means a layer of micro-surfacing laid on a scratch coat or directly on the existing pavement.

### 336.04 DESIGN AND SUBMISSION REQUIREMENTS

#### 336.04.01 Design Requirements

##### 336.04.01.01 Mix Design

A laboratory equipped and staffed to carry out micro-surfacing mix designs shall designate the mix proportions and prepare the job mix formula.

The compatibility of the aggregate and the polymer modified emulsified asphalt shall be confirmed by the laboratory designing the mix.

All component materials used in the mix design shall be representative of the material to be used on the Contract.

The mix design proportions shall be within the following limits:

- a) Residual Asphalt: 6.0 to 11.5% by dry mass of aggregate
- b) Mineral Filler: 0 to 3.0% by dry mass of aggregate

The micro-surfacing material shall be designed to carry traffic within 1 hour of placement.

### **336.04.02 Submission Requirements**

#### **336.04.02.01 Mix Design**

The mix design shall be submitted in writing to the Contract Administrator together with the results of the tests specified in Table 1, 14 Days prior to the start of micro-surfacing.

Micro-surfacing material shall only be placed after the Contract Administrator has issued confirmation in writing within 5 Business Days that the mix design and test results have been reviewed and meet the requirements specified in the Contract Documents

#### **336.04.02.02 Submission of Test Data**

The Contractor shall provide quality control (QC) test results of all aggregates and filler used in the Work from a laboratory meeting the requirements of the Laboratory Requirements clause. Test results showing complete conformance with the physical property requirements of this specification shall be provided to the Contract Administrator at the time of submission of the mix design.

QC test results shall be submitted using MTO forms PH-CC-449a, PH-CC-449b, or PH-CC-449c as applicable. Test data forms must be legible and signed by the testing laboratory representative. Electronic copies are acceptable provided the original is submitted to the Contract Administrator within 5 Business Days following receipt of the copy.

Only aggregate sample test data obtained from stockpiled material to be used in the Work and tested within the past 14 months shall be submitted.

#### **336.04.02.03 Laboratory Requirements**

An acceptable laboratory conducting tests for physical properties or consensus properties shall be one that holds a certificate from the Canadian Council of Independent Laboratories (CCIL) as Type D for the applicable test methods and also participates in the annual MTO Proficiency Sample Testing Program.

An acceptable laboratory conducting tests for LS-601 and LS-602 shall be one that holds a valid certificate from CCIL as Type C. Testing for LS-601 and LS-602 shall be conducted by qualified laboratory staff who hold a valid certificate from CCIL in aggregate testing. Testing for LS-609 shall be conducted by a person holding a valid certificate from CCIL showing them qualified in petrographic examination.

Equivalent alternate laboratory and technician certifications or laboratory proficiency sample testing programs may be used to demonstrate similar requirements, provided they are acceptable to the Owner.

### **336.05 MATERIALS**

#### **336.05.01 Aggregates**

Aggregates shall be according to OPSS 1001.

Aggregates shall meet the requirements specified in Table 2. Aggregates for micro-surfacing Type II shall meet the requirements for a high traffic volume application.  
Aggregates shall meet the gradation requirements specified in Table 3.

**336.05.02 Mineral Filler**

Mineral filler shall be Portland cement, Type GU, GL, according to OPSS 1301 or as specified in the Contract Documents.

**336.05.03 Mix Additives**

Additives shall be compatible with the other components of the micro-surfacing mix.

**336.05.04 Polymer Modified Emulsified Asphalt**

The emulsified asphalt shall be CQS-1HP emulsion with a quick set polymer modifier, and the testing requirements shall meet Table 4 of OPSS 1103.

The polymer modifier shall be a minimum of 3% polymer solids by mass of asphalt cement residue in the emulsion.

The emulsion shall be homogeneous after mixing. To facilitate sampling and testing, the emulsion shall be stable for 14 Days after delivery to the job site. The polymer material shall be milled or blended into the asphalt cement or blended into the emulsifier solution prior to the emulsification process. The addition of polymers or other additives after the manufacture of the polymer modified emulsified asphalt is not permitted.

**336.05.05 Tack Coat**

Tack coat shall be the same polymer modified emulsified asphalt used in the micro-surfacing mix and diluted to one part emulsion to three parts water by volume.

**336.05.06 Water**

The water shall be free of harmful salts and contaminants.

**336.06 EQUIPMENT**

**336.06.01 Mixing Equipment**

The mixing equipment shall be specifically designed and manufactured to mix and place micro-surfacing material. Materials shall be mixed by an automatic sequenced, self-propelled, continuous flow micro-surfacing mixing machine. The mixing unit shall be capable of accurately delivering and proportioning the aggregate, emulsified asphalt, mineral filler, additives, and water to a revolving multi-blade double shaft mixer and discharging the mixed product in a continuous flow. The mixing equipment shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, additives, and water to maintain an adequate supply to meet mix design proportions.

**336.06.02 Pilot Vehicle**

The pilot vehicle shall be according to the requirements of OTM, Book 7.

**336.06.03 Proportioning Devices**

Individual volume or weight controls for proportioning aggregate, mineral filler, emulsified asphalt, additives, and water to be added to the mix shall be provided and properly marked.

#### **336.06.04 Rotary Power Brooms**

Rotary power brooms shall be capable of cleaning gravel, sand, dirt, and other debris from the roadway surfaces.

#### **336.06.05 Spreading Equipment**

The mix shall be spread uniformly by means of a conventional augured surfacing spreader box attached to the mixing machine and equipped with paddles to agitate and spread the mix evenly throughout the box. A front seal shall be provided to ensure no loss of the mix at the pavement contact point. The rear seal shall function as final strike-off and shall be adjustable. The spreader box and rear strike off shall be designed to ensure that a uniform consistency is achieved to produce a free flow of material to the rear strike-off. The spreader box shall be equipped with a suitable means to adjust the box to compensate for variations in the pavement geometry. Rut filling spreader boxes shall be specifically designed for rut filling applications.

The spreading equipment shall be capable of being re-supplied with the micro-surfacing materials within the working lane to continuously place micro-surfacing for a minimum 2-lane-km distance. The machine shall be equipped to allow the operator to have full control of the forward and reverse speeds during application of the micro-surfacing.

### **336.07 CONSTRUCTION**

#### **336.07.01 Operational Constraints**

Micro-surfacing shall be placed only when the atmospheric temperature is at least 10°C and rising and the weather is free of fog or rain and there is no forecast of temperatures below 0°C within 24 hours from the time of application. The mix proportions shall be adjusted when weather conditions prolong opening to traffic beyond 1 hour.

Micro-surfacing shall commence no earlier than May 15 and shall be completed no later than September 30.

Traffic, including construction traffic, shall be kept off the freshly placed mixture to prevent damage to the surface and vehicles.

The Contractor shall delineate the centreline with short term pavement markings at the end of each Day of micro-surfacing placement. Short term pavement markings shall be according to OPSS 710.

#### **336.07.02 Trial Area**

The Contract Administrator shall approve the location of the trial area. A trial area 100 m in length and one lane wide shall be placed at the commencement of the micro-surfacing operation to demonstrate the ability to produce micro-surfacing as specified with this specification. Within 1 hour of placement, the Contract Administrator shall inspect the micro-surfacing for conformance. The trial areas shall be repeated until the micro-surfacing meets the requirements specified in this specification.

#### **336.07.03 Surface Preparation**

The area to be surfaced shall be thoroughly cleaned using a rotary power broom to remove all sand, dirt, and other debris. Areas inaccessible to a rotary power broom shall be manually cleaned.

Existing crack sealing material shall be removed.

Existing durable pavement markings and symbols shall be removed.

Unless specified in the Contract Documents, all pavement surfaces to be micro-surfaced shall be tack coated. Where tack coating is not required, water shall be applied to the pavement surface immediately ahead of the spreader to dampen the pavement surface without allowing any free-standing or free-flowing water.

Existing pavement surfaces to receive micro-surfacing shall be tack coated. Surfaces to be tack coated shall be free of standing water and contamination, such as mud, loose aggregate, and debris. Tack coat shall be applied at a rate of 0.25 to 0.40 kg/m<sup>2</sup> as determined by the Contractor based on the condition of the existing pavement surface. Tack coating shall be allowed to cure sufficiently before application of micro-surfacing.

All roadway appurtenances within the area of micro-surfacing shall be properly covered and protected immediately prior to placement of the micro-surfacing.

### **336.07.04                    Mix Application**

#### **336.07.04.01                General**

Micro-surfacing shall be placed as a scratch and surface coat or a surface coat only, as specified in the Contract Documents.

Additives may be added to the micro-surfacing mix during construction to provide control of the quick-set properties and to increase adhesion.

A sufficient amount of the mixture shall be carried in all parts of the spreader box at all times so that complete coverage is obtained. Water used to spray the spreader box to facilitate spreading shall not harm the mix. Lumping, balling, or unmixed aggregate shall not be permitted in the finished surface. Any oversized aggregate or foreign materials shall be screened from the aggregate prior to delivery to the mixing equipment.

The application rates for individual coats of micro-surfacing shall meet the requirements of Table 4.

Wheel track ruts of 13 mm or greater in depth shall be filled independently with micro-surfacing using a rut-filling spreader box prior to the application of other micro-surfacing. Ruts greater than 25 mm shall be filled with micro-surfacing applied with two passes of the rut filling spreader box. All rut-filling material shall cure under traffic for at least a 24-hour period before additional material is applied. The minimum width of a rut filling micro-surfacing application shall be 1.5 metres.

When specified in the Contract Documents micro-surfacing shall be applied as a scratch coat to fill ruts less than 13 mm in depth, cracks, and shallow potholes to leave a uniform surface.

#### **336.07.04.02                Handwork**

In restricted areas where hand spreading is necessary, adjustments to the mix formula may be made to retard the setting time. The mixture shall be placed along one edge of the surface to be covered and spread uniformly with squeegees or other suitable Hand Tools.

#### **336.07.04.03                Appearance**

Following placement, the micro-surfacing shall have a uniform texture free from excessive scratch marks, tears, indentations, or other surface irregularities. Tear marks or other surface irregularities in any 12 m<sup>2</sup> area per lane are considered excessive if there are:

- a) Four or more marks  $\geq$  12 mm wide and  $\geq$  100 mm long.
- b) Any marks  $\geq$  25 mm wide and  $\geq$  25 mm long.

There shall be no transverse ripples or longitudinal streaks of 6 mm or greater in depth when measured by placing a 3 m straight edge over the finished surface in any direction.

The edges of the micro-surfacing shall be finished uniformly, with a neat appearance along the roadway centreline, lane lines, shoulder, pavement edge, and curb lines.

**336.07.04.04                      Documentation**

A summary of the quantity and application rate of micro-surfacing placed, and a list of the quantities used for each of the mix components (i.e., aggregate, emulsified asphalt, water, mineral filler, and additive) shall be submitted daily to the Contract Administrator.

A summary of the station-to-station limits, quantity, and application rate of the tack coat shall be submitted daily to the Contract Administrator.

**336.07.04.05                      Joints**

The longitudinal and transverse joints shall be neat and uniform in appearance, with no excessive build-up. Longitudinal joints shall be placed on lane lines.

The longitudinal joints in the scratch coat shall be constructed as a butt joint.

The longitudinal joint in the surface course shall have an overlap of 50 to 100 mm.

**336.07.05                              Clean Up**

All areas not to be micro-surfaced, such as shoulders, ditches, and gutters, shall have excess material removed on a daily basis.

Appurtenances shall be free of micro-surfacing and left in operable condition.

**336.07.06                              Traffic Convoy**

The Contractor shall convoy traffic according to OTM, Book 7.

The pilot vehicle shall guide one-way traffic through or around construction. The maximum speed of the convoy shall be 30 km/h. Convoying shall be maintained until such time as the micro-surfacing mixture is able to carry traffic without damage.

**336.07.07                              Repairs**

All repairs to address appearance deficiencies specified in the Appearance clause shall consist of an additional application of micro-surfacing for the full lane width over the length of deficiency.

The length of repair shall be sufficient to eliminate all appearance deficiencies. If the distance between repair areas is less than 3 m, then the adjacent repairs shall be treated as one repair.

**336.07.08                              Management of Excess Material**

Management of excess material shall be as specified in the Contract Documents.

**336.08                                      QUALITY ASSURANCE**

**336.08.01                              Sampling and Testing**

Sampling shall be conducted by the Contractor according to LS-625. Quality assurance (QA) samples shall be taken from stockpiles of aggregate to be used in the Work. Sampling locations shall be determined by the Contract Administrator.

Duplicate samples shall be obtained and sealed by the Contractor in the presence of the Contract Administrator. One of the duplicate samples shall be randomly selected for testing by the QA laboratory and the remaining sealed sample shall be retained by the QA laboratory for possible referee testing. In the event that the Contractor is unavailable to take the sample, no further material shall be placed in the Work until the QA sample has been taken. Samples shall be of sufficient mass of the material to conduct the necessary gradation and physical property tests.

All QA samples shall be delivered by the Contractor, within 24 hours of sampling, to a location specified in the Contract Documents.

Notwithstanding the requirements for QA sampling as indicated in this specification, the Owner reserves the right to obtain a QA sample at any time without notice.

### **336.08.02                   Warranty Requirements**

#### **336.08.02.01               Warranty Period**

The warranty period shall be 24 months.

#### **336.08.02.02               Completion of Warranty Period**

At the end of the warranty period, the work shall meet the requirements specified in the Performance Requirements clause in order for the Contractor to be released from responsibility and ensure return of the performance bond or letter of credit or certified cheque.

#### **336.08.02.03               Distress Survey**

The Owner shall complete a distress survey according to the severity and density definitions provided in SP-024 after the end of 1 year and a second distress survey a minimum of 45 Days prior to the end of the warranty period. The results of both surveys shall be submitted to the Contractor.

If the Owner determines that the distresses pose a hazard to the travelling public at any time during the warranty period, the Contractor shall be required to make the repairs as specified in this specification within 14 Days of being notified. Repairs shall be made to the approval of the Owner.

#### **336.08.02.04               Performance Requirements**

At the end of the warranty period, the micro-surfacing shall be free from any aggregate loss or ravelling that is slight to very severe and from flushing that is moderate to very severe. The density of flushing that is very slight to slight shall not be greater than intermittent.

If the micro-surfacing does not meet these performance requirements, the necessary repair or replacement methods shall be as specified in Table 5. Repairs shall be made to the approval of the Owner.

The length of repair shall be sufficient to eliminate all surficial defects as described. If the distance between repair areas is less than 3 m, then the adjacent repairs shall be treated as one repair.

**336.09 MEASUREMENT FOR PAYMENT**

**336.09.01 Actual Measurement**

**336.09.01.01 Micro-Surfacing Type II  
Micro-Surfacing Type III Modified  
Micro-Surfacing Type III  
Removal and Disposal of Existing Crack Sealant  
Removal and Disposal of Durable Pavement Markings**

Measurement of the micro-surfacing placed shall be by area in square metres.

**336.09.01.02**

Measurement of existing crack sealant for removal shall be by linear metres.

Measurement of existing durable pavement markings shall be by linear metres.

**336.09.01.03**

Measurement of existing durable symbols shall be by each.

**336.10 BASIS OF PAYMENT**

**336.10.01 Micro-Surfacing Type II - Item  
Micro-Surfacing Type III Modified - Item  
Micro-Surfacing Type III Item  
Removal and Disposal of Existing Crack Sealant - Item  
Removal and Disposal of Existing Durable Pavement Markings - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

All costs associated with repairing and replacing unacceptable trial areas shall be borne by the Contractor.

The accepted trial area shall be paid for at the Contract unit price for micro-surfacing.

Repair, removal, disposal, and replacement of any damaged or defective micro-surfacing shall be at no extra cost to the Owner.

Any work requirements, as determined by the distress survey for repair or replacement of micro-surfacing, shall be completed at no extra cost to the Owner.

All costs for handling and delivery of samples shall be the responsibility of the Contractor.

All costs associated with the removal and disposal of existing crack sealant identified for removal shall be included in the unit price for the item.

All costs associated with the removal and disposal of durable pavement markings shall be included in the unit price for the item.

**TABLE 1**  
**Mix Design Requirements**

<b>Test Method</b>	<b>Description</b>	<b>Requirements</b>
ISSA TB-100	Wet track abrasion loss-one hour soak	538 g/m <sup>2</sup> maximum
	Loss-six-day soak	807 g/m <sup>2</sup> maximum
ISSA TB-109	Excess asphalt by LWT sand adhesion	538 g/m <sup>2</sup> maximum
ISSA TB-113	Mix time @ 25°C	Controllable to 120 seconds minimum
ISSA TB-139	Wet cohesion	
	- @ 30 minutes min. (Set) - @ 60 minutes min. (Traffic)	12 kg-cm minimum 20 kg-cm minimum
ISSA TB-144	Classification compatibility	(AAA, BAA) 11 Grade Points minimum
ISSA TB-147 Method A	Lateral displacement	5% maximum
	Specific gravity after 1000 cycles of 57 kg	2.10 maximum

**TABLE 2**  
**Micro-Surfacing Coarse and Fine Aggregates Requirements**

<b>Micro-Surfacing Type</b>	<b>Application</b>	<b>Physical Requirements as Specified in OPSS 1003</b>
II	Low Traffic Volume	Superpave 12.5
II	High Traffic Volume	Superpave 12.5 FC1
III Modified	N/A	Superpave 12.5 FC1
III	N/A	Superpave 12.5 FC1
<p>Note:</p> <p>A. Aggregates meeting the physical requirements of Superpave 12.5 aggregates shall be produced from quarried bedrock consisting of 100% siliceous aggregate determined according to LS-609.</p>		

**TABLE 3  
Gradation Requirements**

<b>Percent Passing, LS-602</b>			
<b>MTO Sieve Designation</b>	<b>Micro-Surfacing Type II</b>	<b>Micro-Surfacing Type III Modified</b>	<b>Micro-Surfacing Type III</b>
9.5 mm	100	100	100
6.7 mm	--	95-100	--
4.75 mm	90-100	80-95	70-90
2.36 mm	65-90	50-75	45-70
1.18 mm	45-70	33-55	28-50
600 µm	30-50	25-40	19-34
300 µm	18-30	15-30	12-25
150 µm	10-21	7-20	7-18
75 µm	5-15	5-15	5-15

**TABLE 4  
Micro-Surfacing Single Layer Application Rates**

<b>Micro-Surfacing Type</b>	<b>Application Rate kg/m<sup>2</sup></b>
Type II	5 to 11
Type III and Type III Mod	8 to 16

**TABLE 5  
Micro-Surfacing Repair and Replacement Methods**

<b>Surface Defects</b>	<b>Severity</b>	<b>Density</b>	<b>Repair/Replacement Method</b>
Flushing	Very slight to slight	Frequent to throughout	Resurface with one layer of micro-surfacing for a full lane width
	Moderate to very severe	Few to throughout	Removal by milling of all flushed areas for a full lane width and replace with two layers of micro-surfacing.
Aggregate Loss / Ravelling	Slight to moderate	Few to throughout	Resurface with one lift of micro-surfacing for a full lane width.
	Severe to very severe	Few to throughout	Fill in delaminations/potholes with micro-surfacing and resurface with two layers of micro-surfacing.
<p>Note:</p> <p>A. Surface defect definitions according to SP-024.</p>			

## **Appendix 336-A, April 2026 FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS**

**Note:** This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

### **Designer Action/Considerations**

Micro-surfacing is a thin wearing course that seals the pavement surface and improves frictional resistance. Micro-surfacing does not address structural deficiencies.

The designer should specify the following in the Contract Documents:

- Any existing pavement surfaces not requiring tack coat. (336.07.03)
- If the application is to be one or two coats (i.e., scratch and surface or only surface). (336.07.04)
- Location of testing laboratory for sample delivery. (336.08.01)
- Type of micro-surfacing. (336.10.01)
- Adjustment of existing appurtenances ahead of micro-surfacing. (336.07.03)

If verbal confirmation of the mix design review and compliance is acceptable or no mix design review is required, the designer should consider deleting the requirement for the Contract Administrator to issue confirmation in writing that the mix design has been reviewed and meets the specified requirements. (336.04.01.01)

For projects with extensive intersection and urban work, the designer should consider deleting the requirement for equipment capable of continuous placement operations and allowing for a truck mounted unit. (336.06.01 and 336.06.05)

Crack sealant is typically removed prior to micro-surfacing when the crack sealant shows signs of deterioration or debonding. Crack sealant that has been in place less than 1 year can interfere with the micro-surfacing operations. For projects with existing crack sealant, the designer should determine if the crack sealant should be left in place and if so, delete the requirement for the removal of the existing crack sealing material. (336.07.03)

If a thick scratch coat is anticipated, the designer may consider deleting the requirement for tack coat. (336.07.03)

For projects with ruts greater than 13 mm, the designer should consider specifying the locations for the use of a rut-filling spreader box, including the locations for 2 passes of the rut filling spreader box. (336.07.04) When the average rut depth is greater than 20 mm, the designer should consider requiring a coarse aggregate gradation (Type III gradation) for rut fill mix.

For projects where a traffic convoy is not feasible or desired, the designer should consider deleting the requirement for a traffic convoy. (336.07.06)

If the forms in Appendices 336-B, 336-C, or 336-D are to be used for submission purposes rather than the MTO forms, they need to be invoked by reference in the Contract Documents, and a special provision should be written to delete the MTO forms from the specification.

Typically, two coats (i.e., scratch and surface coats) are specified to remove severe surface defects.

This specification should not be used in areas with the prevalence of studded tires or where pavements exhibit high deflection.

### **Appendix 336-A**

Type II micro-surfacing with Superpave 12.5 quality aggregate is used on local residential streets and low volume arterial and collectors. Type II micro-surfacing with Superpave 12.5 FC1 quality aggregate is used on higher volume arterials and collectors. Type III micro-surfacing is used on freeways and other high-speed, high-volume roads. Type III Modified micro-surfacing is used in lieu of Type III micro-surfacing to reduce traffic generated noise.

Micro-surfacing should be carried out in warm dry weather.

Micro-surfacing should be carried out between May 15 and September 30.

Routing and crack sealing should not be carried out prior to micro-surfacing.

Quality of micro-surfacing is critically dependent on appropriate mix design, equipment, and construction experience.

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

### **Related Ontario Provincial Standard Drawings**

No information provided here.